WAIHEKE ISLAND ARTWORKS & LIBRARY

environmental design guide

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architects pacific environments NZ Ltd

WAI
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INTRODUCTION

The library design draws on the imagery of books arranged under a canopy of pohutakawa trees for its sculptural form. This concept is supported by simple low maintenance, low energy sustainable design initiatives to provide a high quality user environment of enduring value.

The library is entered through a sheltered courtyard along with other existing amenities such as a theatre, art gallery, cinema and restaurant. On entering the library, the simple layout of central book shelves surrounded by a variety of seating, studying and meeting spaces is clearly apparent and easily navigated. A children's reading platform rises above the book shelves and creates a playful environment as a pirates crow's nest, Romeo and Juliet balcony or any other scene that may come to the imagination.

Large sliding doors open up the north side of the building providing a seamless indoor/outdoor flow to the new courtyard and amphitheatre space where stories might be read, outdoor chess played or music and theatre performed.

Orientation of the library has been considered to provide maximum sunlight into the building in winter with carefully proportioned roof overhangs providing shade in summer. The height and depth of the building has also been optimised to provide the best possible natural daylight and ventilation. Windows are all automatically controlled but can still be adjusted to suit individual comfort levels.

All rain is collected off the roof, stored in three large underground tanks, and supplies all the water needed for the building including a reservoir for firefighting. All windows are double glazed, roofs and walls highly insulated and an array of photovoltaic panels has been designed to provide all the energy required to run the building during summer.

Magnificent artwork by internationally renowned local artist Kazu Nakagawa has been fully integrated into the façade, wall linings and floor of the building.

Dialogue with Ngati Paoa iwi in regard to sensitive historical ancestral issues specific to the site led to sightlines significant to them being incorporated in to the open space courtyard design and marked by an installation of beautifully carved pou.

PLAN SUMMARY OF FEATURES

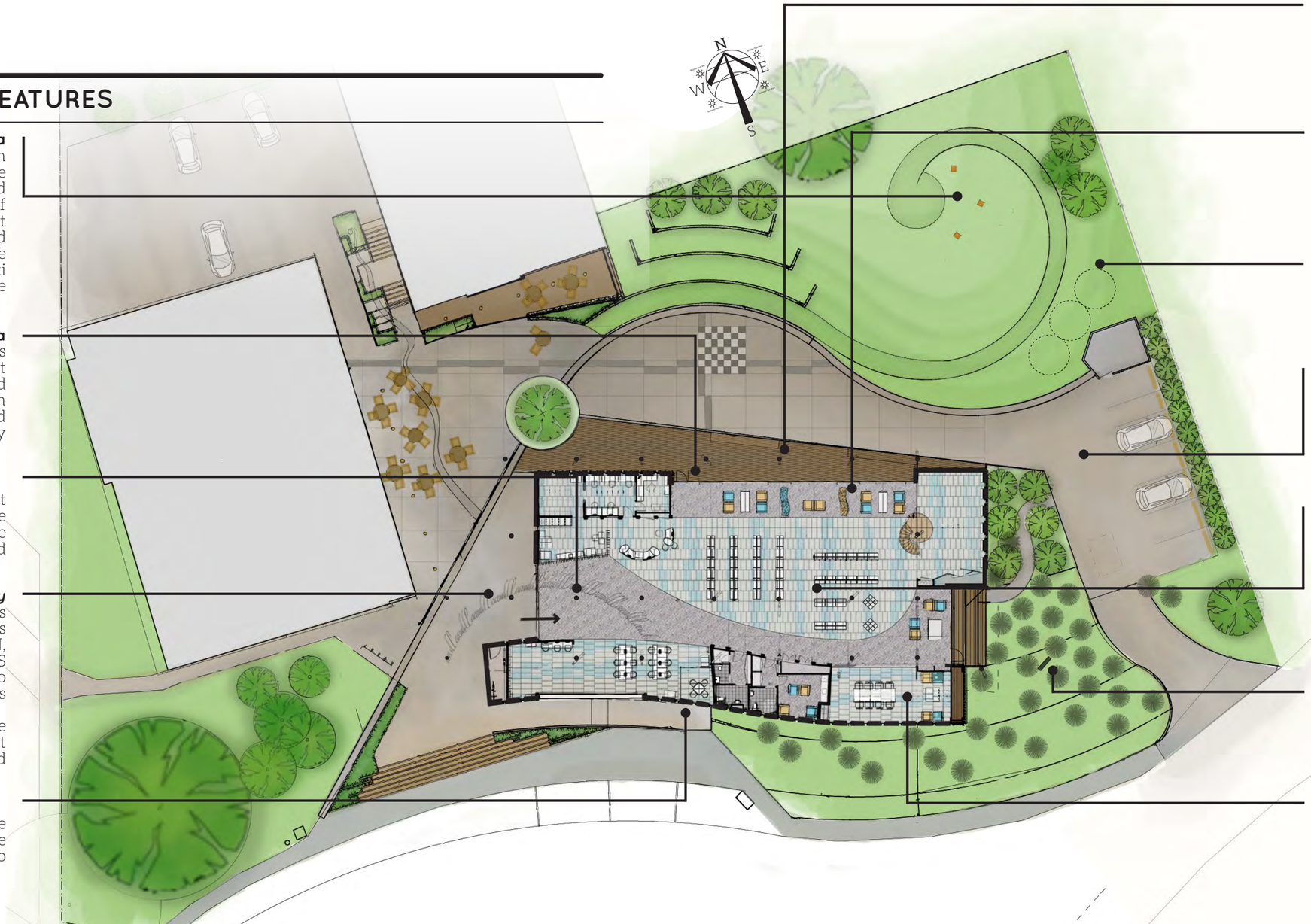
ARTWORK - Waiheke Pou Whakara three pou whenua and a navigation stone have been created where there are unobstructed views toward historic and natural landmarks of significance, including Tikapa (Gannet Rock), Rangihoua (Putiki o Kahu) and Piritaha (Piritahi). The project is the result of collaboration between Ngāti Pāoa, Piritahi Marae and Waiheke High School.

ARTWORK - Ngaruhora by Lorna Dixon-Rikihana (Ngāti Pāoa) is a dynamic graphic treatment that wraps the building's exterior and interior glass surfaces. This is based on Taratara-ā-Kae, the crescent wave and whale motif known as Ngaruhora by Ngāti Pāoa.

TIMBER COLUMNS
Round timber columns arranged at random angles are a reference to tree trunks of a canopy of trees. Above the columns are decorative plywood panels with leaf shaped perforations

ARTWORK -Kazu Nakawawa's *forty nine letters* pays tribute to Waiheke's climatic conditions with the words - LOTS OF RAIN, LOTS OF SUN, LOTS OF WIND, LOTS OF DAY, LOTS OF NIGHT literally embedded into the very fabric of the new library's building.
Etched into the building's concrete floor is a repeating text that incorporates 'whenua', 'land', 'hau' and 'wind.'

SCULPTURED TIMBER BATTENS
Timber battens sculptured in a wave like manner texture the façade of the building which has been modulated to look like a row of books.



DECKS.
Low thermal mass decking is located outside north facing glazing to mitigate outside heat being radiated back into the building during hotter months of the year.

THERMAL MASS.
Polished concrete floors provide thermal mass in front of north facing windows. In floor heating will supplement solar heating during winter months.

UNDERGROUND RAIN WATER COLLECTION TANKS.
3x 2200L tanks collect and store rain water for fire fighting and building water supply.

STORMWATER TREATMENT & DISPOSAL.
Stormwater running over carpark and paved areas is treated through a filter system and then detained in underground tanks before discharged in a slow controlled manner.

NATURAL VENTILATION & COOLING.
The building is predominately naturally ventilated and cooled through a combination of low and high level opening windows. Large slow moving fans assist airflow on still days and heat pumps assist cooling smaller enclosed rooms during peak occupancy.

ARTWORK - The Great Optimism by Bob Stewart is an elegant assembly of cast iron pounamu, Arahura schist, stainless steel and marble, to form a stately vertical slab.

PERIMETER ENCLOSED ROOMS.
Enclosed spaces around the perimeter of the building are of optimum depth for one sided ventilation.

SKETCH SUMMARY OF FEATURES

ROOF SHADING.
The eaves on the roof will shade the building interior from most summer sun to mitigate overheating during the hotter months of the year.

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Low thermal mass decking is located outside north facing glazing to mitigate outside heat being radiated back into the building during hotter months of the year.

THERMAL MASS.
Polished concrete floors provide thermal mass in front of north facing windows. In floor heating will supplement solar heating during winter months.

FEATURE CEILING.
A perforated plywood ceiling provides a mixture of additional natural daylight in the middle of the building as well as acoustic absorption to mitigate excessive reverberation. Rain impact noise is dampened with 18mm plywood under the metal roofing.

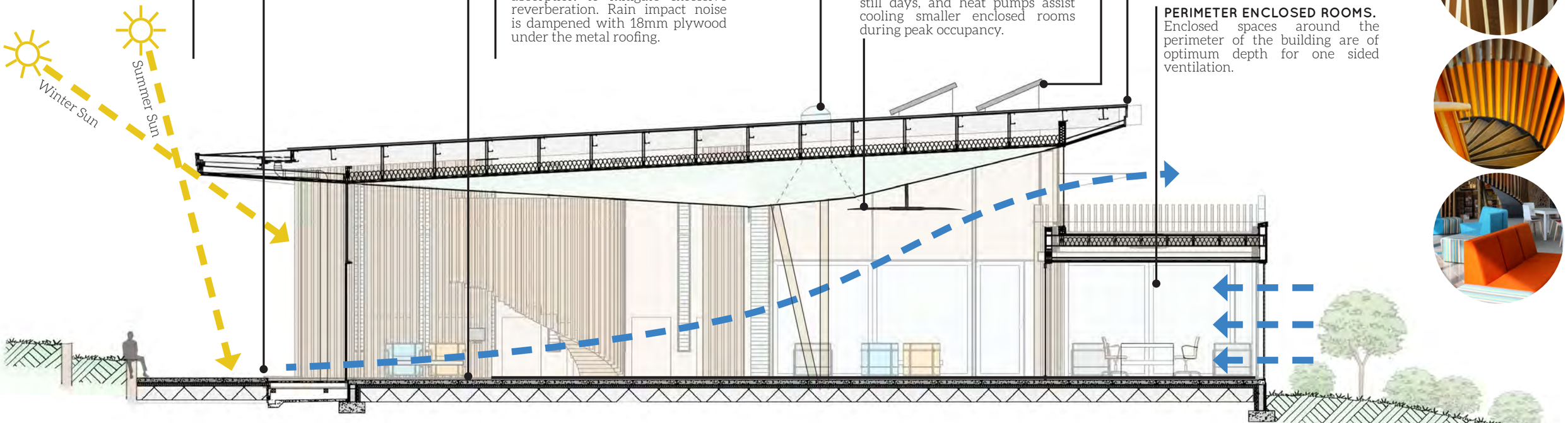
DAYLIGHT TUBES.
Daylight tubes in the centre of the building supplement daylight provided by the perimeter clerestory windows.

NATURAL VENTILATION & COOLING.
The building is predominatly naturally ventilated and cooled through a combination of low and high level opening windows. Large slow moving fans assist airflow on still days, and heat pumps assist cooling smaller enclosed rooms during peak occupancy.

PHOTOVOLTAIC PANELS.
Photovoltaic panels estimated to produce the same amount of electricity as the building consumes during summer.

INSULATED & REFLECTIVE ROOF ASSEMBLY.
An insulation level of R 5.0 is in the roofing assembly, together with a light coloured solar reflective colour/coating.

PERIMETER ENCLOSED ROOMS.
Enclosed spaces around the perimeter of the building are of optimum depth for one sided ventilation.



PLACE

HISTORY

The new library building is located on a previously developed site which includes a series of other buildings that make up the Waiheke Island Artworks complex. The remaining older buildings were formerly a.building works depot and currently house the art gallery, theatre, cinema, café, museum and the space vacated by the old library. They have been altered and developed over time in an ad-hoc manner to make them as fit for purpose as possible for the activities inside. A vacant church building residential house, and studios converted from bulk material stores were removed to make way for the new library.

Some locals on the island believe an underground spring may exist on site. Evidence of flooding in areas of the theatre and old library space certainly indicate there are issues in regard to water ingress which could easily have been compounded by new construction. This has been acknowledged with careful design of overland water flow paths and concrete paving patterns around the new building.

NATIVE PLANTING

Existing native vegetation has been retained where ever possible, including Pohutukawa (Metrosideros excels), Copse (Grisilinea lucida), Native shrub mix (Cordyline australis, Leptospermum scoparium, Phormium tenax, Pseudopanax spp, Griselinea lucida, Arthropodium cirratum), Cabbage Tree (Cordyline australis), Nikau (Rhopalostylis sapida), Titoki (Alectryon excels),

The building and courtyard space was designed around an existing Indian Bead (Melia azederach) which was protected throughout construction and becomes a pivotal feature of the complex providing a shady canopy over its grassed mound in summer. The Melia being deciduous shows the passage of the seasons with lilac flowers in spring / summer, yellow berries in autumn and a full leaf drop over winter.
Prior to construction a sizable Strelitzia (Strelitzia Nicolai) that was identified as being a significant example ofts species on the island, along with some smaller Cabbage Trees (Cordyline australis) were relocated to Alison Park,

Significant new native planting was undertaken to reconnect the site to the green belt of vegetation across the road at Alison Park including: 160 Crimson Rata (Metrosideros carmine), 190 Creeping Fuchsia (Fuchsia Procumbens), 30 Poor Knights Lily (Xeronema callistemon), 248 Pohuehue (Muehlenbeckia complexa), 1104 Harakeke - Mountain Flax (Phormium cookianum), 27 Harakeke - NZ Flax (Phormium tenax), 342 Miniature toe toe (Chionochloa flavicans), 35 Nikau (Rhopalostylis sapida), and 1 Feature Pohutukawa (Metrosideros excels)

Native plating has also been supplemented by edible plating including: 11 Feijoa Bambina (Feijoa sellowiana), 6 Peach (Prunus persica), 6 Lime (Citrus aurantifolia) along with a large grass terraced amphitheatre formed through the retention of all existing top soil on the site. The terracing faces directly to courtyard and library deck space to provide for local performance with the hill behind providing for an lookouts and a connection back to the history of the site and its people.

WATER

In an ideal environmentally sustainable and restorative design, all water supply and discharge demands would be either be met on site, or connected to a wider infrastructure which did not change the natural hydrological conditions that the infrastructure was part of.

RAINWATER HARVESTING WATER SUPPLY & TREATMENT

- The library includes full rainwater harvesting by storing water collected off the roof in three, twenty two thousand litre tanks which are buried below the grassed amphitheatre embankment behind the library.
- The stored water is first filtered and then treated through ultraviolet disinfection before it is used in the building. It is the only water supply for the building.
- The volume of tank storage was calculated based on rainfall data from the last 20 years, the available roof area and an assumed amount of water use per person. Based on this data and assumptions the storage capacity is estimated to provide over 99% of the water demand.
- If the water level gets too low in the tanks, a red light flashes in the staff work room and an email alert is sent to the council call centre.

REDUCING POTABLE WATER USE

- The greatest water demand in the library is expected to be for flushing toilets.
- Dual flush WELS (Water Efficiency Labelling Scheme) Star Rated toilets (3 star) have been installed
- Time flow taps on wash hand basins have been installed.
- High WELS Star Rated shower (3 star) and sink taps (5 star)have been installed.

WASTE WATER TREATMENT AND DISPOSAL

- Waste water is collected and processed by a primary treatment system using anaerobic bacteria.
- Solids are separated from liquid which is then discharged to the local network utility infrastructure currently managed by Water Care.
- Periodically the system will require the emptying of solids as these build up over time.

STORM WATER TREATMENT AND DISPOSAL

- Rainwater off the roof is stored in water tanks which have an overflow to underground detention tanks.
- This overflow function is also used as a vacuum sytem to reduce any sediment build up in the water tanks.
- Stormwater running over hard paved surfaces is processed through catchpits to remove any heavy particles, and then detained in the underground tanks which provide further settlement of particles.
- The surface water from the main courtyard and car park areas is also treated through a filter system to remove major contaminants.
- The primary role of the underground detention tank is to capture intense rain fall and allow its flow to be controlled prior to to discharge to the local stream.

WATER METERING

- A meter has been installed to measure the amount of water pumped from the rainwater tanks to the building.
- Another meter has also been installed to measure the amount of water pumped from the waste water treatment tanks to the local network utility waste treatment connection currently managed by Water Care.

FIRE FIGHTING SUPPLY

- A hydrant connected to the water tanks has been provided.
- The configuration of the tanks ensures an agreed mimimum amount of water will always be available for fire fighting if required .

ENERGY

In an ideal environmentally sustainable and restorative design, a building would rely solely on renewable forms of energy either generated on site or as part of a wider infrastructure. It is estimated about 70% of the energy in New Zealand is provided from renewable sources, however it is also estimated that during peak energy demand times, the reliance on non renewable energy sources increases. substantially.

REDUCING ENERGY REQUIREMENTS

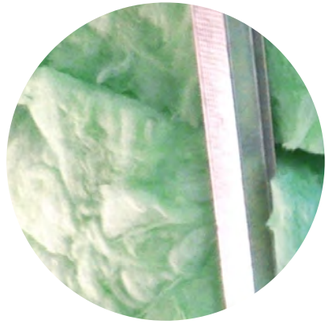
- Orientation of the library has been considered to provide maximum sunlight into the building in winter. The sun warms up exposed concrete thermal mass insulated floors which provide passive heating to supplement winter heating requirements.
- Carefully proportioned roof overhangs provide shade in summer to protect the building from overheating and reduce airconditioning cooling requirements.
- The height and depth of the library has been optimised to provide the best possible natural daylight and ventilation to reduce artificial lighting and mechanical ventilation requirements.
- Energy efficient lighting with daylight and occupancy sensors has been installed.
- High levels of insulation and double glazed windows have been provided to reduce heating and cooling requirements relative to outside air temperatures.
- In New Zealand buildings are generally heated by a warm air supply to between 20 and 22 degrees. In England buildings are generally heated by hot water radiators to between 18 and 20 degrees. If the library is heated to the lower temperature it will save 10% to 15% in energy costs. The building is heated by a radiant underfloor hot water system.

ESTIMATED ENERGY DEMAND

- An energy analysis of the building has estimated that about half of the annual energy required to run the building will be for equipment such as computers , photocopiers and other plug-in equipment or appliances.
- The analysis estimates a further third of the annual energy consumption will be for heating the building in winter.
- Meters have been installed on separate lighting, space heating, space cooling, water pumping, water heating and plug-in power circuits so that the actual energy requirements of the building can be measured and any unpredicted energy loads identified.

PHOTOVOLTAIC PANELS AS AN ON SITE RENEWABLE ENERGY SOURCE

- 80 photovoltaic panels will be installed and are expected to provide 20,000 kWh/annum of energy.
- This is estimated to meet the energy demand of the building in summer.



HEALTHY INDOOR ENVIRONMENT

We want to create environments that optimise the health and well being of people occupying them.

LIGHT AND VENTILATION

- In every regularly occupied space of the building there is an operable window that provides access to fresh air and daylight.
- The height and depth of spaces have been optimised to ensure that windows provide effective natural light and ventilation throughout the full depth of the building.
- The opening windows are automated by carbon dioxide sensors to ensure the library is provided with sufficient fresh air, particularly in winter when there is otherwise a tendency to keep windows closed.

HEATING

- In winter heating is provided by an underfloor radiant system.
- The underfloor heating is supplemented by winter sun warming up exposed concrete insulated floors which then passively emit further radiant warmth to the building.

COOLING

- In summer the roof overhangs shade the sun to prevent overheating and the opening windows provide good cross ventilation.
- Opening windows are automated by temperature sensors which can be manually overridden to accommodate individual occupant comfort levels as required. The windows default back to the automated setting after a prescribed period of time.
- Additional large ceiling fans provide futher air movement and comfort during any really humid still days in mid summer.
- Airconditioning is provided as a back up to some of the smaller rooms should they become uncomfortable from large and frequent variances in occupancy

ACOUSTICS

- The perforated plywood ceiling panels below the skylights were originally designed as acoustic panels intended to line the entire ceiling.
- In the end an alternative acoustic ceiling system was selected, and this is very apparent wherever you can see the patterns of small square perforations on the ceiling. Above these perforations are fabric and insulation which deaden what would otherwise be a very echoic space.

MATERIALS

Throughout their lifecycle, materials can be responsible for many adverse environmental issues including illness, habitat and species loss, pollution and resource depletion.

- Where possible, most materials specificed for the libary have been verified as eco-preferred through a third party verification scheme such as Enviromental Choice New Zealand.
- The decorative battens on the walls of the library are "Vitex", which is likely to have been harvested by small community villages in the Solomon Island who selectively fell trees using portable mills. Returns from the timber sales are understood to improve standard of village living
- The sleepers forming the planters, amphitheatre seating terraces and stair nosings are Totara, which we have been told were sourced from trees felled last century and buried in swamps.
- The carpet tiles at the time of specification was the only tile in New Zealand to have third party certified cradle-to-cradle assessment and states the products will never be returned to landfill. It has an active take-back policy that ensures the manufacturer covers the cost of transporting the up-lifted tiles back to their recycling facility.
- The rock for the retaining walls is all sourced locally from Waiheke Island.

ART & BEAUTY

The new building and grounds of Waiheke Pātaka Kāreri / Waiheke Library are enriched by four works of permanent that evoke the island's distinct stories and character.

As explained in the introduction, the design concept for the library is based on the idea of reading books under a canopy of trees.

- The walls of the library have been modulated to represent a series of book spines.
- The columns have been angled to represent a forest of tree trunks.
- The design of the ceiling panels was inspired by looking up from under a canopy of leaves.
- The colour of the ceiling is inspired by the underside colour of a potutakawa leaf.

POU WHENUA

This Ngati Paoa initiated Pou Whenua project was a collaboration between Ngati Paoa, Piritahi Marae and Waiheke High School. These three carved totara pou stand as a public artwork for the Waiheke community. The ideals of Tika, Pono, Aroha - Past, Present and Future - Tapa Toru are incorporated in the works.

POU NGATI PAOA

Looking north east, this pou is orientated towards Tikapa (Gannet Rock) after which Tikapa Moana (Hauraki Gulf) takes its name. It was on Tikapa that karakia were made by those of both the Tainui and Te Arawa waka on first arriving in Aotearoa. Paoa descends from both these waka and this outlook reminds us of the sea aspect of the Ngati Paoa territories and the Hauraki whakapapa of Tukutuku, Paoa's wife.

This pou faces towards the point on the horizon from which the star constellation of Matariki rises as it appears in midwinter, marking the start of the Maori New Year. This pou reminds us of the past.

Carved in the style of Hauraki, this pou represents Ngati Paoa the iwi. Use of the matakupenga – fish net notch, talks of knowledge sharing, wananga, and the sea faring traditions of Ngati Paoa, the use of ngao matariki on the the neck references Matariki while the use of pakura (swamp-hen footprint) acknowledges the whenua and the local kaitiaki, the Pukeko.

Design by Lucas Thompson; Carvers Lucas Thompson, Hemi Thompson and Chris Bailey.

POU WAIHEKE HIGH SCHOOL

Looking east, this pou is orientated towards the school and its maunga (hill) Putiki o Kahu (Rangihoua), the hill that stands at the head of Putiki inlet. This pou is looking to the future and in the direction of the rising sun.
"Ka pu te ruha ka hao te rangatahi"

The title refers to the constant cycle of change and mentoring from youth to experience. The concepts of these life transactions are explored as young people grow and develop skills due to mentoring from older, experienced generations. This whanau concept also reinforces the value and tikanga inherent in a community working together to achieve goals. The origin of this whakatauaki speaks of an old fishing net having reached the end of its use, and the need for replacing it with a new net, however, it is through the knowledge, skills and experience of the masters that the traditional arts of making new nets is passed down through the generations. This teaching is reflected in the student's time and duration at school. As they mature and take their leave, the younger ones move a year forward with many taking leadership roles. The implied link to the moana (sea) reminds one of Waiheke's proximity to the Hauraki Gulf. This whakatauaki is used in the Waiheke High School haka that ask's, "Ko wai ra te kura e tu mai nei?" - Who are we that stand before you?

Design by Pita Mahaki and Chris Bailey; Carvers Nico Otero, Chris Bailey and Teddykoro Whatarangi; Artwork for the bronze tags created by Year 11 Art students Kalia Andrews, Bianca Beachamp, Lily Brennan-Town, Thomas Codling, Melisha Gotje, Maurice James, Summer Lane, Greer Linder, Jesse Meighan, Lillie Ord, Jude Pemberton, Harrison Raby, Mizuki Shibata with support from Reon Shirnack, Reuben Shortland, Tayla Muir, Curtis Johnson, Finley Duilomaloma, Linda McKelvie, Sally Smith and Annie Melchior.

POU PIRITAHI MARAE

Looking south, this pou is orientated towards Piritahi Marae and its maunga (hill) Piritaha. This pou references the present.

Drawing on the concept of Pataka Matauranga (Storage House of Knowledge), the use of the Taratara a kai notch talks of the pataka of old. The manaakitanga of the Marae and kaitiakitanga for the islands ecology are referred to while the bronze insert shows a representation of nga hau e wha – of the four winds, the understanding that all are welcome at Piritahi no matter from where you come.

Design by Chris Bailey; Carvers Chris Bailey and Nico Otero. Support from Andrew Alexander, Matthew Shortland and Amelia Hastings.

NGARUHORA

Ngaruhora by Lorna Dixon-Rikihana (Ngāti Pāoa) is a dynamic graphic treatment that wraps the building's exterior and interior glass surfaces. It is based on the Taratara-ā-Kae pattern, which is comprised of repeated pairs of crescent waking wave and whale motifs. This pattern signifies the nourishment of stored food and knowledge

To this motif Dixon-Rikihana adds the manaia, or side facial profile, as Ngaruhora's core design element. The artist renders the eyebrow shape as a crescent moon, which also resembles a seed pod with its upper edge dotted with purapura or kakano seed patterns.

Colour choice and placement is based upon the cardinal directions and the specific Atua Māori: kumara/purple in the west, blue in the east, and green in the north.

THE GREAT OPTIMISM

The Great Optimism by Bob Stewart, is an elegant assembly of cast iron, pounamu, Arahura schist, stainless steel and marble, to form a stately vertical slab.

Purchased by Waiheke's former community board in honour of the late artist, The Great Optimism returns to this location with the completion of the new library.

FORTY NINE LETTERS

Kazu Nakagawa's ***Forty Nine Letters*** pays tribute to Waiheke's climatic conditions that the artist, a long-time resident, describes with these words - LOTS OF RAIN, LOTS OF SUN, LOTS OF WIND, LOTS OF DAY, LOTS OF NIGHT. This phrase is literally embedded into the very fabric of the new library's building.

Over six months, Nakagawa hand-carved the phrase letter by letter across the expanse of the building's southern waved-batten façade. It moves in and out of focus with the island's ever-shifting light conditions. The phrase maintains continuity on the façade's glass surfaces with ceramic frit letters.

Etched into the building's concrete floor with overlapping calligraphic script, here the words form a lyrical pattern of repeating text that incorporates 'whenua', 'land', 'hau' and 'wind.'

An artwork that is both expansive and restrained, Forty Nine Letters acknowledges the library as a repository for the written word while it poetically evokes Waiheke's natural environment.

NZ Wood Resene Timber Design Awards
Winner Overall Supreme Award
2015

NZ Wood Resene Timber Design Awards
Winner Commercial Architectural Excellence
2015

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